Great Salt Lake Selenium Studies
Project 2B
Synoptic Survey of Selenium in Water, Seston, and *Artemia* Biomass

Brad Marden
Parliament Fisheries, LLC

In cooperation with the
Utah Strategic Alliance

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Project Objectives

Objective #1:

- Document the temporal and spatial characteristics of total selenium (T-Se) in water and correlate with seston and *Artemia* tissue concentrations.

Objective #2:

- Correlate isotopic 15N and 13C levels with T-Se in *Artemia* tissue.

Objective #3:

- Monitor primary production indicators and record *Artemia* population dynamics.

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Project Calendar

Month	Workplan Sampling Freq.	Workplan # Sites	Completed # Sites	Proposed Sampling Freq.
April	1x	6	7	1x
May	2x	9	9	2x
Jun	2x	9	9	2x
July	2x	6	6	2x
Aug	1x	6	nd	2x
Sep	1x	6	nd	1x
Oct	1x	6	nd	1x
Nov	1x	6	nd	1x

Additional sampling program in August is recommended to compensate for missed water and seston samples in May and July.

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Samples and Methods

Artemia Biomass

- Separated into three size/age-classes (adults, juveniles, nauplii&cysts).
- Only Adults and Cysts currently anticipated to be analyzed.
- Stored in freezer.
- To be analyzed for total selenium and 15N and 13C isotopes.

Artemia Cysts:

- Floating accumulations of cysts in close proximity to sample sites were opportunistically collected when available.
- To be analyzed for total selenium and 15N and 13C isotopes.
- Stored in freezer.

GSL Water Samples:

- Collected with peristaltic pump and tubing.
- Filtered through 125 micron sieve.
  - One 250 ml volume preserved with nitric acid (approx. pH 2)
  - One 1000 ml volume preserved with Lugol's solution and saved for possible micro-algae analysis.
- Filtered through 0.45 micron filter (dissolved selenium).
  - One 250 ml volume preserved with nitric acid (approx. pH 2).

All water samples to be analyzed for total selenium.

Seston:

- 1000 ml filtered via positive pressure through 0.45 micron 110 mm NC filter then frozen (for total Selenium analysis).
- 50 ml filtered via positive pressure through 0.45 micron 47 mm GF filter then frozen (for Chl A analysis)

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Number of Samples Collected

Month	Artemia Biomass (Workplan)	Artemia Biomass (Collected)	Seston Samples (Workplan)	Seston Samples (Collected)
April	12	14	0	0
May	36	34	18	9
June	36	36	18	9
July	24	24	12	12
Aug	12	---	6	---
Sep	12	---	6	---
Oct	12	---	6	---
Nov	12	---	6	---

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Number of Samples Collected (Continued)

Month	GSL Water (Workplan)	GSL Water (Collected)	GSL 0.45 uM Water (Workplan)	GSL 0.45 uM Water (Collected)
April	0	0	0	0
May	18	9	0	9
June	18	9	0	9
July	12	12	0	12
Aug	6	---	0	---
Sep	6	---	0	---
Oct	6	---	0	---
Nov	6	---	0	---

Additional samples of 0.45 micron filtered GSL water were opportunistically collected and are available for selenium analysis. Also, One-liter volumes of unfiltered GSL water samples were collected for possible determination of phytoplankton.

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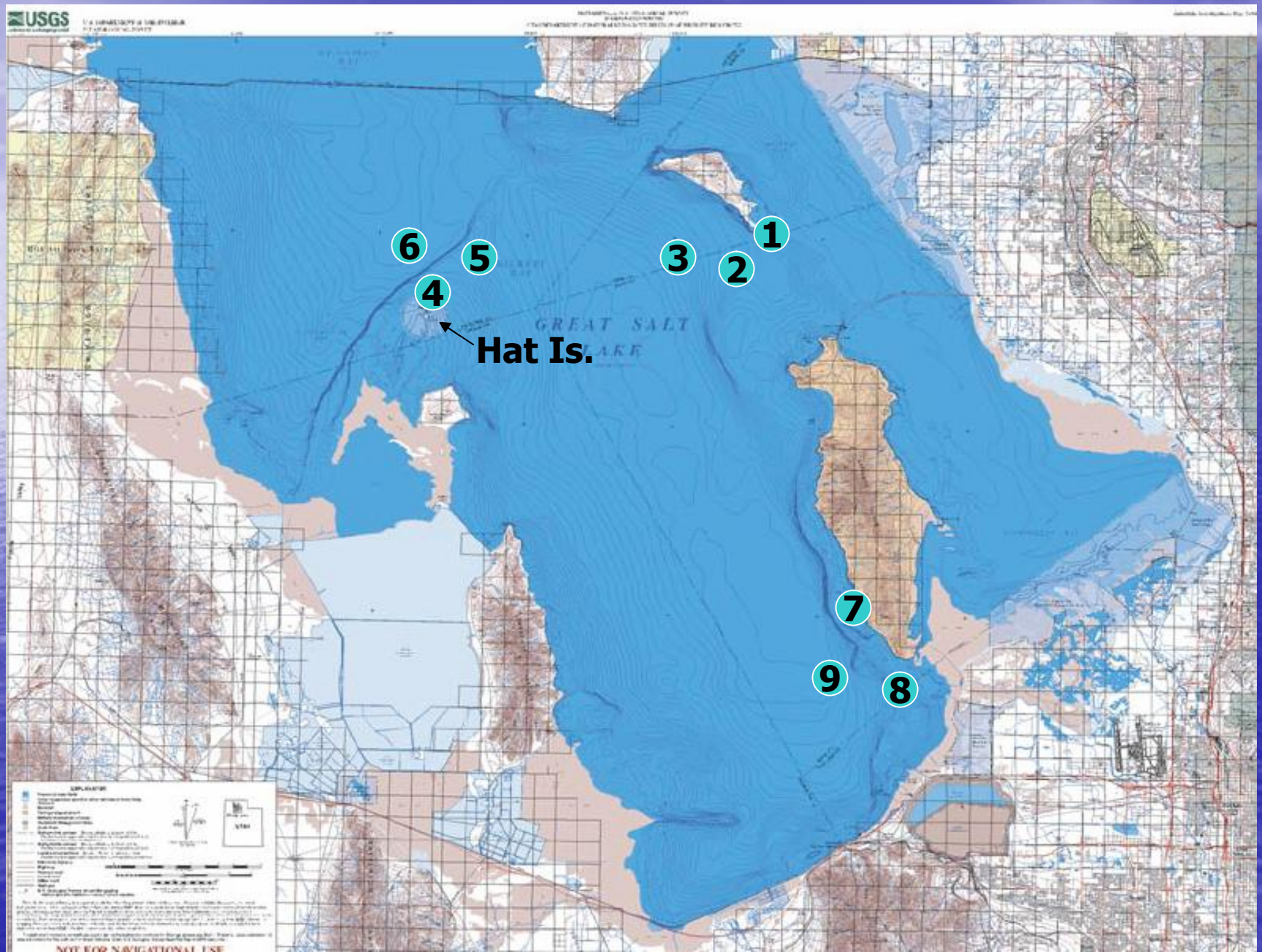
Sampling Locations



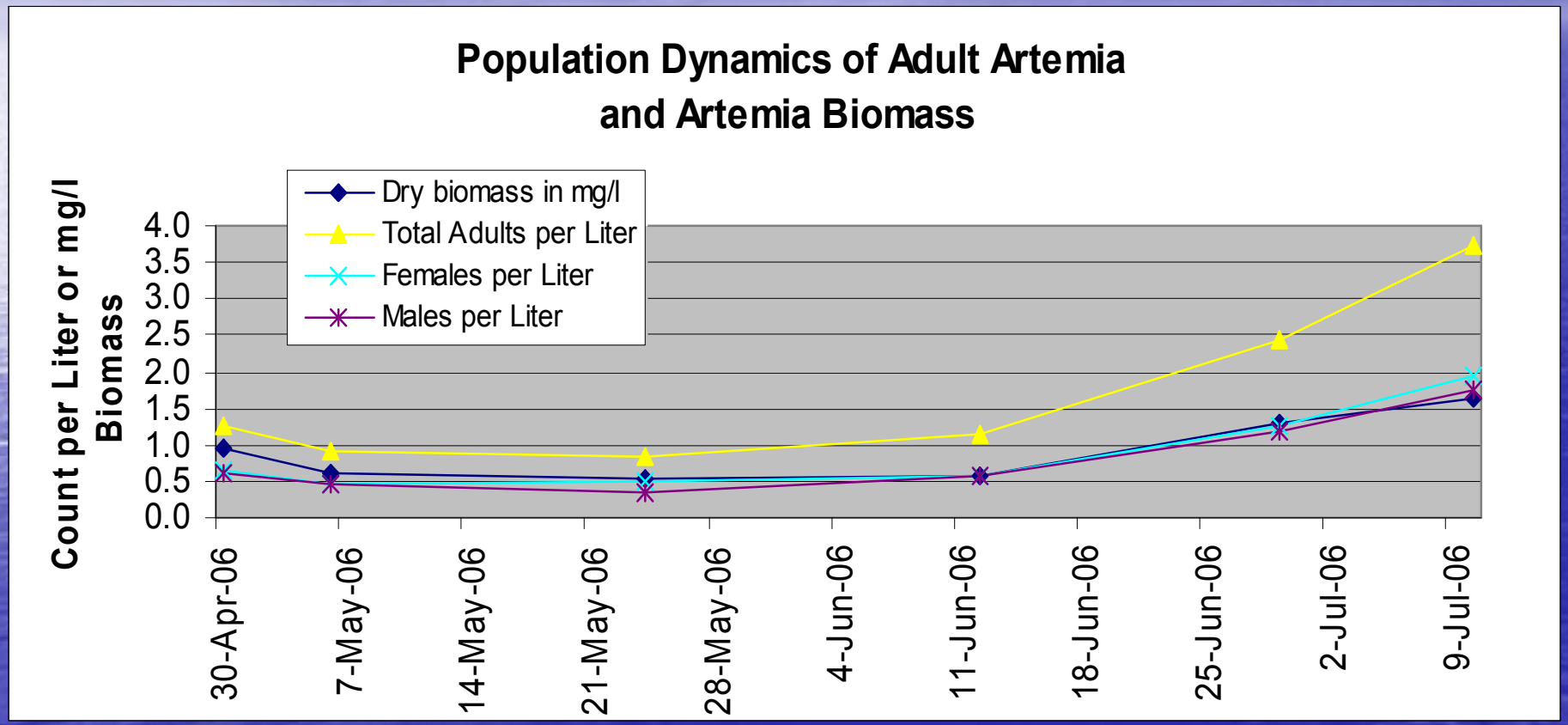
Sample Collection Methods

Artemia: Plankton Net **Water Samples: Peristaltic Pump** **Seston: Positive Pressure Filtration.**

Samples Requiring Laboratory Analysis

Month	Artemia Biomass N and C Isotopes	Chl A Analysis
April	14	7
May	34	17
June	36	18
July	24	12
Aug	nd	nd
Sep	nd	nd
Oct	nd	nd
Nov	nd	nd

RESULTS
Artemia Population Dynamics



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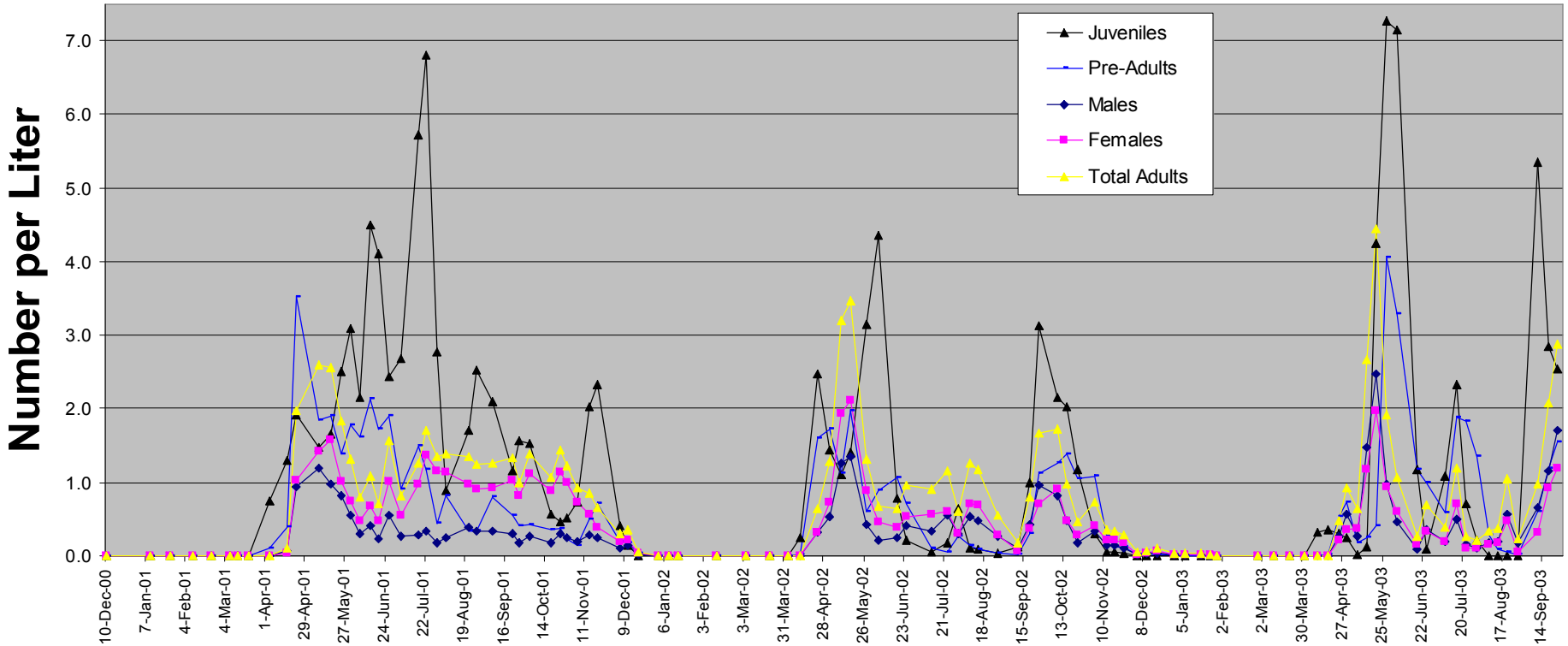
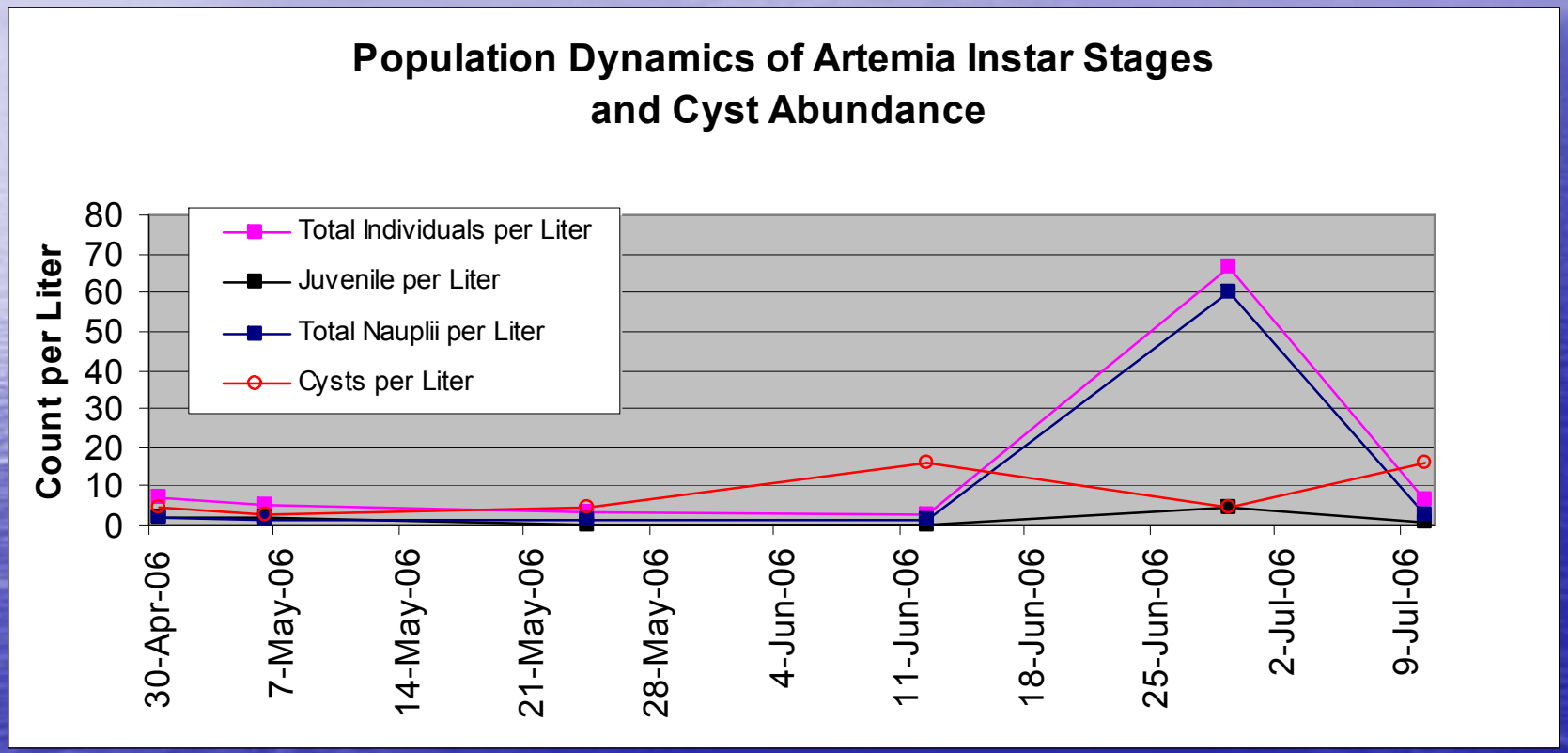
RESULTS
Comparative Population Dynamics
2001 to 2003

Juvenile, Pre-adult, and Adult Population Trends 2001-2003



RESULTS
Population Dynamics



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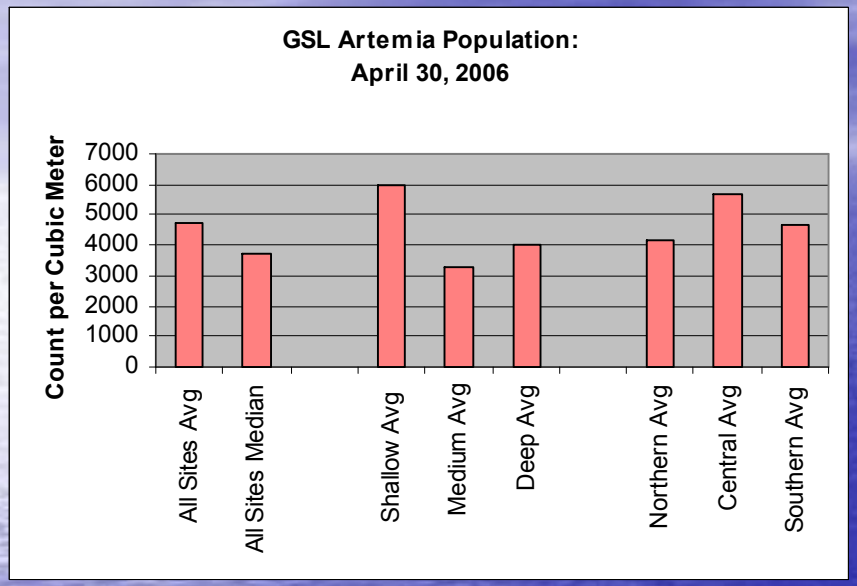
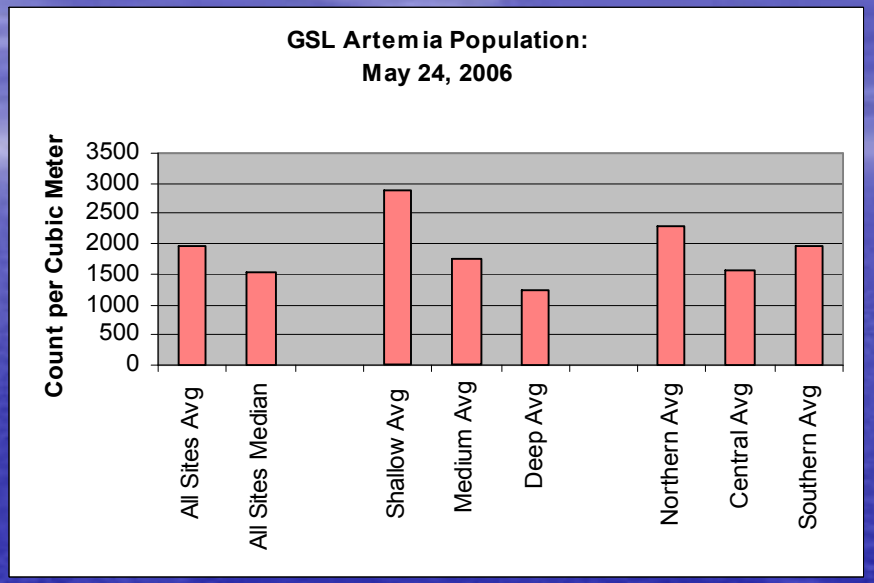
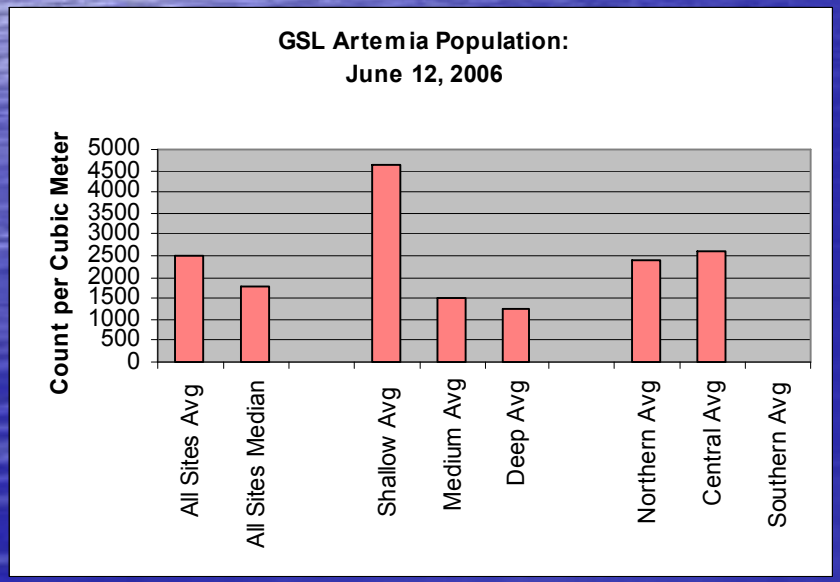
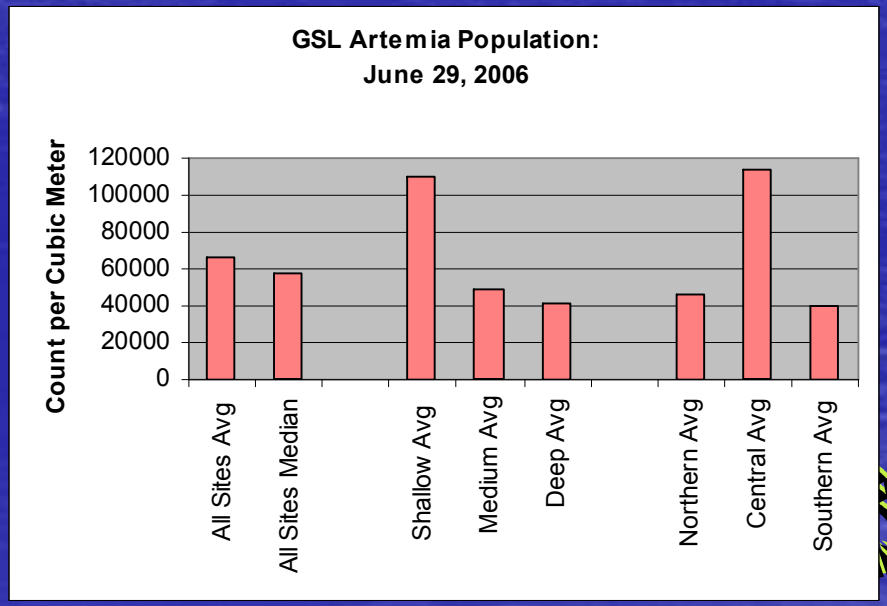
Artemia Population Size

Shallow sites are consistently the most productive per volume.









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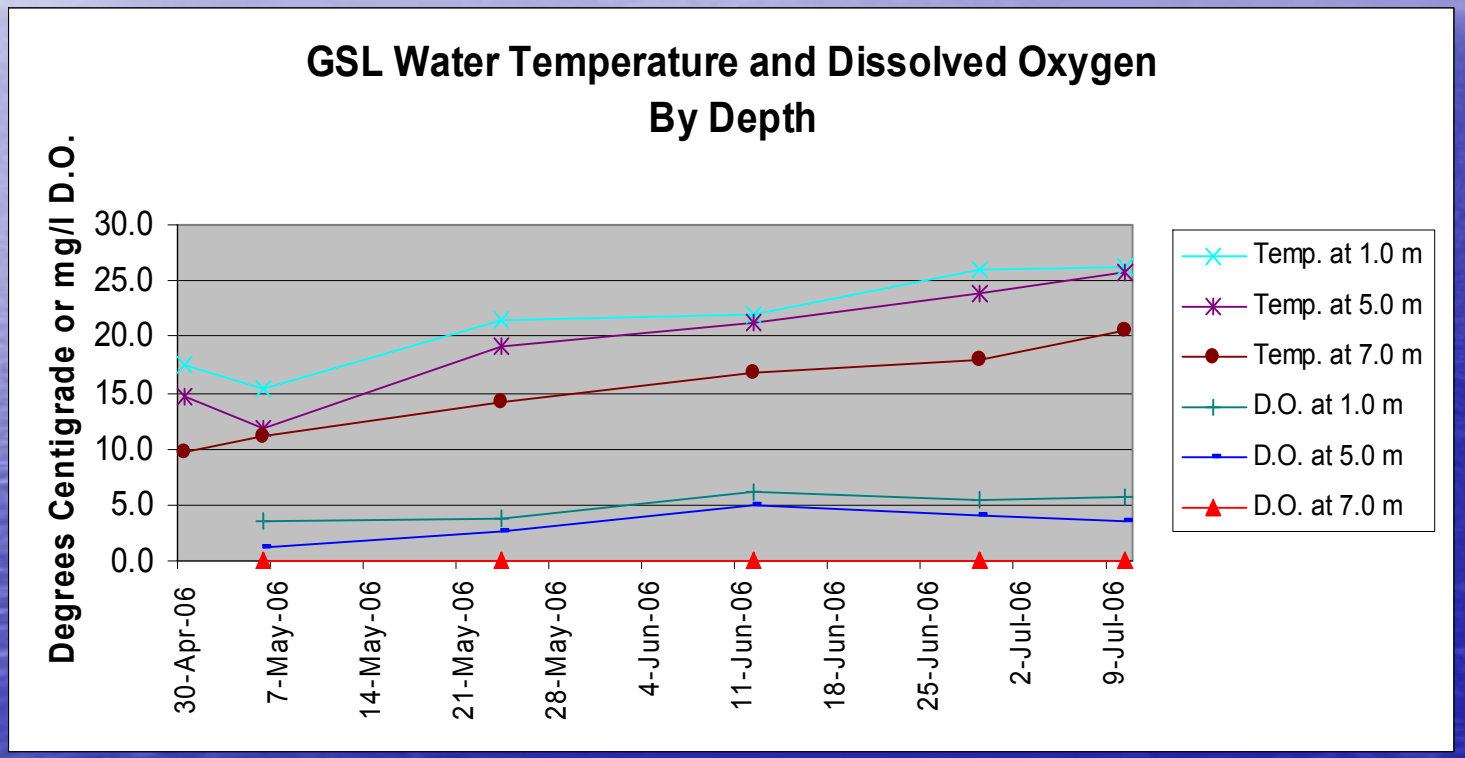
RESULTS
Abiotic Conditions of GSL



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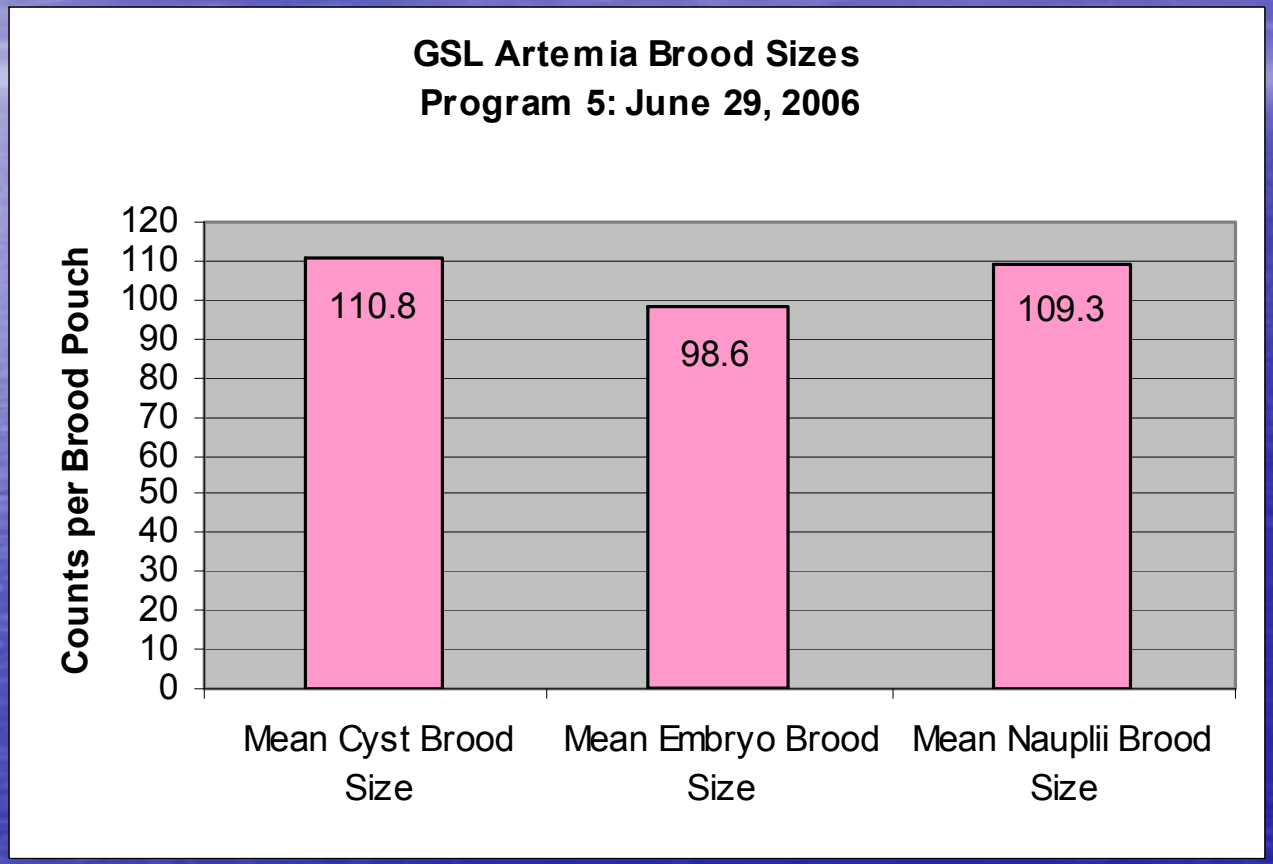
RESULTS
Artemia Reproduction



Brood sizes suggest that the phytoplankton composition is adequate to support a high reproductive output by the Artemia population.

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CURRENT PRIORITIES

- Shipment of samples to labs for selenium and isotope analyses.
- Purchase equipment and supplies.
- Payment to USAH subcontractor.
- Continue with sampling program.

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Appendix A

Concerns regarding contract and funding delays

Anticipated Contract and Funding Timeline: April 2006
Contract Execution Date: July 21st, 2006
Initial Payment Date: July 28th, 2006

Complications arising due to delays in funding:

- **Need to minimize personnel time, equipment acquisitions, and supply expenses.**
- **Project financed by Brad Marden, PFC and USAH during April, May, June, and July.**
- **Inability to maintain full-time assistant position.**
- **Incomplete sample collection due to delays in purchasing sampling equipment.**
- **Substantial additional legal expenses.**
- **Prolonged delays in sample holding time.**
- **No samples sent for laboratory analysis.**
- **Serious complications with USAH regarding sub-contract for vessel, vehicles, and laboratory facility.**
- **Milestones and deliverable schedule compromised.**

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